

Claims

- [c1] 1. A conveyor comprising:
- a conveyor belt running along a conveying path in a direction of belt travel and including an article-conveying surface extending transverse to the direction of belt travel from a first side to a second side; wherein the conveyor belt includes a plurality of article-supporting rollers at the article-conveying surface arranged to direct supported articles toward the first side of the conveyor belt as the conveyor belt runs in the direction of belt travel;
 - a movable obstruction defining a pivot point disposed above the article-conveying surface of the conveyor belt between the first and second sides of the conveyor;
 - wherein the movable obstruction intercepts a conveyed article and the article pivots at the pivot point as the conveyor belt runs in the direction of belt travel.
- [c2] 2. A conveyor as in claim 1 wherein the movable obstruction is movable between a first position over the article-conveying surface obstructing conveyed articles

and a second position not obstructing conveyed articles.

- [c3] 3. A conveyor as in claim 2 wherein the movable obstruction remains in the first position for a preselected period of time.
- [c4] 4. A conveyor as in claim 1 wherein the movable obstruction swings out over the article-conveying surface of the belt from a position at the first side of the belt.
- [c5] 5. A conveyor as in claim 1 wherein the movable obstruction comprises a pusher bar extensible from the first side of the belt out over the article-conveying surface.
- [c6] 6. A conveyor as in claim 1 wherein the movable obstruction comprises a foldable side rail.
- [c7] 7. A conveyor as in claim 1 wherein the position of the pivot point over the article-conveying surface is changeable during its contact with a conveyed article.
- [c8] 8. A conveyor as in claim 1 further comprising a sensor detecting the presence of a conveyed article at a specific position on the conveyor.
- [c9] 9. A conveyor as in claim 8 wherein the sensor is selected from the group consisting of photo eyes, limit switches, weight sensors, ultrasonic sensors, and capaci-

tive sensors.

[c10] 10. A conveyor as in claim 8 wherein the conveyor belt comprises a pair of parallel conveyor belts separated by a gap and wherein the sensor is positioned beneath the conveyor belt along the conveying path and vertically aligned with the gap.

[c11] 11. A conveyor as in claim 8 wherein the sensor produces a signal indicative of a misoriented or oversized article on the article-conveying surface of the belt.

[c12] 12. A conveyor comprising:
a conveyor carryway;
a conveyor belt supported on the carryway and running in a direction of belt travel and including an article-conveying surface extending transverse to the direction of belt travel from a first side to a second side;
wherein the conveyor belt includes a plurality of article-supporting rollers in rolling contact with the carryway that extend above the article-conveying surface and that are arranged to rotate about axes oblique to the direction of belt travel to direct supported articles toward the first side of the conveyor belt;
a rail at the first side of the conveyor belt to receive

articles directed across the belt;
a movable obstruction including a pivot point disposed over the carryway above the article-conveying surface of the conveyor belt between the first and second sides of the conveyor;
wherein the movable obstruction intercepts a conveyed article and the article pivots at the pivot point as the conveyor belt runs in the direction of belt travel.

[c13] 13. A conveyor as in claim 12 wherein the movable obstruction is movable between a first position over the article-conveying surface obstructing conveyed articles and a second position not obstructing conveyed articles.

[c14] 14. A conveyor as in claim 13 wherein the movable obstruction remains in the first position for a preselected period of time.

[c15] 15. A conveyor as in claim 12 wherein the movable obstruction swings out over the article-conveying surface of the belt from a position along the rail.

[c16] 16. A conveyor as in claim 12 wherein the movable obstruction comprises a pusher bar extensible from the rail out over the article-conveying surface.

[c17] 17. A conveyor as in claim 12 wherein the position of the

pivot point over the article-conveying surface is changeable during its contact with a conveyed article.

[c18] 18. A conveyor as in claim 12 further comprising a sensor detecting the presence of a conveyed article at a specific position on the conveyor.

[c19] 19. A conveyor as in claim 18 wherein the sensor is selected from the group consisting of photo eyes, limit switches, weight sensors, ultrasonic sensors, and capacitive sensors.

[c20] 20. A conveyor as in claim 18 wherein the conveyor belt comprises a pair of parallel conveyor belts separated by a gap and wherein the sensor is positioned beneath the conveyor carryway and vertically aligned with the gap.

[c21] 21. A conveyor as in claim 18 wherein the sensor produces a signal indicative of a misoriented or oversized article on the article-conveying surface of the belt.

[c22] 22. A conveyor comprising:
an angled-roller belt extending in width from a first side to a second side and in thickness from a top surface to a bottom surface and traveling in a direction of belt travel, the angled-roller belt including:
a plurality of article-supporting rollers having salient portions extending beyond the top and bottom sur-

faces, the rollers arranged to rotate about axes oblique to the direction of belt travel;
a roller bearing surface disposed beneath the angled-roller belt in contact with the plurality of rollers to rotate the rollers about the axes and direct conveyed articles toward the first side of the angled-roller belt;
a movable obstruction disposed above the top surface of the angled-roller belt and defining a pivot point about which conveyed articles intercepted by the movable obstruction pivot as the belt travels.

- [c23] 23. A conveyor as in claim 22 wherein the movable obstruction is movable between a first position over the top surface obstructing conveyed articles and a second position not obstructing conveyed articles.
- [c24] 24. A conveyor as in claim 23 wherein the movable obstruction remains in the first position for a preselected period of time.
- [c25] 25. A conveyor as in claim 22 wherein the movable obstruction swings out over the top surface of the belt from a position at the first side of the belt.
- [c26] 26. A conveyor as in claim 22 wherein the movable obstruction comprises a pusher bar extensible from the

first side of the belt out over the top surface.

- [c27] 27. A conveyor as in claim 22 wherein the movable obstruction comprises a foldable side rail.
- [c28] 28. A conveyor as in claim 22 wherein the position of the pivot point over the top surface is changeable during its contact with a conveyed article.
- [c29] 29. A conveyor as in claim 22 further comprising a sensor detecting the presence of a conveyed article at a specific position on the conveyor.
- [c30] 30. A conveyor as in claim 29 wherein the sensor is selected from the group consisting of photo eyes, limit switches, weight sensors, ultrasonic sensors, and capacitive sensors.
- [c31] 31. A conveyor as in claim 29 wherein the conveyor belt comprises a pair of parallel conveyor belts separated by a gap and wherein the sensor is positioned beneath the conveyor belt along the conveying path and vertically aligned with the gap.
- [c32] 32. A conveyor as in claim 29 wherein the sensor produces a signal indicative of a misoriented or oversized article on the top surface of the belt.
- [c33] 33. A conveyor comprising:

an angled-roller belt traveling in a direction of belt travel, the angled-roller belt including:
a plurality of article-supporting rollers arranged to rotate about axes oblique to the direction of belt travel as the angled-roller belt is traveling;
a movable obstruction disposed over the angled-roller belt in a position to contact conveyed articles and to act as a pivot about which conveyed articles can pivot as the angled-roller belt is traveling.

[c34] 34. A conveyor as in claim 33 wherein the movable obstruction is movable between a first position over the angled-roller belt obstructing conveyed articles and a second position not obstructing conveyed articles.

[c35] 35. A conveyor as in claim 33 wherein the movable obstruction remains in the first position for a preselected period of time.

[c36] 36. A conveyor as in claim 33 wherein the movable obstruction swings out over the angled-roller belt from a position beside the belt.

[c37] 37. A conveyor as in claim 33 wherein the movable obstruction comprises a pusher bar extensible out over the angled-roller belt.

[c38] 38. A conveyor as in claim 33 wherein the movable ob-

struction comprises a foldable side rail.

- [c39] 39. A conveyor as in claim 33 wherein the position of the pivot point over the angled-roller belt is changeable during its contact with a conveyed article.
- [c40] 40. A conveyor as in claim 33 further comprising a sensor detecting the presence of a conveyed article at a specific position on the conveyor.
- [c41] 41. A conveyor as in claim 40 wherein the sensor is selected from the group consisting of photo eyes, limit switches, weight sensors, ultrasonic sensors, and capacitive sensors.
- [c42] 42. A conveyor as in claim 40 wherein the angled-roller belt comprises a pair of parallel angled-roller belts separated by a gap and wherein the sensor is positioned beneath the angled-roller belt along the conveying path and vertically aligned with the gap.
- [c43] 43. A conveyor as in claim 40 wherein the sensor produces a signal indicative of a misoriented or oversized article on the angled-roller belt.
- [c44] 44. A method for rotating a conveyed article and registering it against a rail, comprising:
 - providing a rail along the side of a moving roller-top

conveyor belt;
conveying an article along the moving roller-top conveyor belt having rollers arranged to rotate to direct the article toward the rail;
moving an obstruction to a position above the roller-top conveyor belt to intercept articles conveyed along the roller-top conveyor belt and cause the articles to rotate at the obstruction as the roller-top conveyor belt moves.

- [c45] 45. The method of claim 44 further comprising:
registering the conveyed articles against the rail upstream of the obstruction.
- [c46] 46. The method of claim 44 further comprising:
registering the conveyed articles against the rail downstream of the obstruction.
- [c47] 47. The method of claim 44 further comprising:
sensing a misoriented or oversized article on the conveyor and producing a signal indicating a misoriented or oversized article; and
moving the obstruction between obstructing and unobstructing positions in response to the signal.
- [c48] 48. The method of claim 44 further comprising:
moving the obstruction while it is in contact with a

conveyed article.

- [c49] 49. The method of claim 44 further comprising:
rotating conveyed articles 90° about the obstruction.